Production of rhamnolipids by locally isolated Pseudomonas aeruginosa using sunflower oil as carbon source

ABSTRACT

Biosurfactants are surface active compounds and amphiphatic in nature which consist of hydrophilic head and hydrophobic tail accumulating at the interphase of two immiscible liquid with different polarity. A study was conducted to investigate the effectiveness of sunflower oil in the production of rhamnolipids (RLs) by locally isolated Pseudomonas aeruginosa in shake flask fermentation. In this process, four different fermentation treatments were done for seven days at 30°C and 180 rpm. Sampling was carried out in time intervals of 24 h followed by monitoring of cell growth and biosurfactants production. Colorimetric Orcinol analysis was used for determination of RLs concentrations (g/L). The RLs were studied for emulsification activity using emulsification index (E24%) methods. In addition, oil displacement activity and thermal stability were also studied (4-120°C). All treatments allow the growth of P. aeruginosa and the utilization of sunflower oil as carbon source and glucose as growth initiator were observed to be the best strategy for maximum RLs production. The maximum RLs production was achieved after 120 h with 3.18 g/L of RLs. Diesel shows the highest emulsification activity among the substrate tested ranging from 55.56% - 60.00%. The oil displacement activity was corresponding to RLs concentration with stability up to 120°C (for 60 min). Therefore, from this research a good potential of RLs that may provide good application for industry were produced.

Keyword: Biosurfactants; Emulsification; Rhamnolipids; Pseudomonas aeruginosa